REMARKS

Claims 1-30 and 32-36 are pending in the application, of which the Examiner has withdrawn Claims 1-13, 15, and 18-24 from further consideration. Claims 14, 16, 17, 25-30, and 32-36 stand rejected. In response, Claims 1-13, 15, 18-24, 30 and 32-36 have been cancelled, certain claims have been amended, and new claims have been added to more distinctly claim the Applicants' invention. Reconsideration and further examination are requested.

Claim Rejections Under § 112

Claims 14, 16, 17, 25-30, and 32-36 have been rejected under 35 U.S.C. § 112, first paragraph. In response, Claims 30 and 32-36 have been cancelled and Claim 14 has been amended to more specifically recite the structure of the liquid crystal display, which the Examiner agrees is drawn to the elected species, as stated at page 2 of the Office action mailed January 12, 2001. Support for the amendments is found at least on specification page 21, line 23 through page 23, line 17.

Thus, the § 112 rejections of Claim 14, as well as the other claims that depend from Claim 14, are overcome.

Reconsideration of the rejections under 35 U.S.C. § 112 is respectfully requested.

Claim Rejections Under § 103

Claims 14, 25, 26, 30, and 31 have been rejected under 35 U.S.C. § 103(a) based on U.S. 5,867,795 to Novis et al. Claims 16, 17, and 28 have been rejected under 35 U.S.C. § 103(a) based on Novis in view of U.S. 5,579,165 to Michel et al. Claim 27 has been rejected under 35 U.S.C. § 103(a) based on Novis in view of U.S. 5,506,705 to Yamamoto et al. Claim 29 has been rejected under 35 U.S.C. § 103(a) based on Novis et al. in view of U.S. 5,579,165 to Michel et al. and further in view of U.S. 5,206,749 to Zavracky et al.

The Applicants' display system, as illustrated in Figure 12A, includes a switching circuit (1133) that is under the direction of a timing circuit (1122). A common voltage (V_{com}) enters a

counterelectrode panel of a display (1112) at alternating values controlled by the switching circuit (1133). In addition, a processor (1104) receives image data at an input (1121), and sends display data to memory (1124) and flash memory (1125) via the timing circuit (1122). The image data also travels from the timing circuit (1122) to an array of pixel electrodes of the display (1112). Furthermore, the timing control circuit (1122) receives clock and digital control signals from the processor (1104) and transmits control signals to a backlight (1111), which is a light source for illuminating images presented on the display.

In operation, with the common voltage set to (V_{com})high, an actual video signal is scanned into the pixel electrodes of the display (1112), and the backlight (1111) is flashed to present the image on the display. Driving the common voltage to (V_{com})low erases the image. However, the backlight (1111) is not on at that time, and therefore the loss of the image is not seen. With the common voltage now set at (V_{com})low, an inverted video signal is scanned into the pixel electrodes, and then, after a delay, the backlight (1111) is flashed again to present the refreshed image or new image. Driving the common voltage to (V_{com})high erases the image that has just be scanned into the pixel electrodes. The timing circuit (1133) determines when the image is presented on the display, and when the setting of the common voltage applied to the counterelectrode is switched to erase the image.

In contrast, Novis discusses, as illustrated in its Figures 5 and 6, a portable electronic device including a virtual image display positioned within a housing or a remote unit. Novis's display (40) includes an apparatus (41) that provides an image on a surface (42). A lens (44) is positioned in space relation to the surface (42) and produces a virtual image that is viewable by an eye (46) from an aperture (45) defined by the lens (44). The apparatus (41) includes a light emitting device (LED) array (47) driven by data processing circuits (48). Novis's data processing circuits (48) include, for example, logic and switching circuit arrays for controlling each LED in the LED array (47). Additionally or alternatively, the data processing circuits (48) include a microprocessor for processing input signals of software instructions to produce a desired image on the LED array (47). Novis states at column 7, lines 7-12 that other image generating devices instead of LEDs may be utilized, including liquid crystal devices.

Novis's display circuit, however, does not include the Applicants' switch (1133) that selects a common voltage applied to the liquid crystal display, as recited in amended independent Claim 14, or more particularly, that selects a common high or low voltage applied to a counterelectrode panel of the liquid crystal display, as stated in new dependent Claims 37-39.

Therefore, without a switching circuit that switches a common applied voltage to a liquid crystal display, Novis's display system cannot include the claimed timing circuit that determines when the display control circuit actuates the pixel electrodes to present an image, and flashes the light source to illuminate the image, and when the switching circuit switches the common voltage applied to the liquid crystal display to erase the image, as required by amended Claim 14.

As for the secondary references, the Office Actions cites Michel as teaching a LCD device with an LED for illuminating an array of pixel electrodes, Yamamoto as teaching a color sequential LCD device, and Zavracky as teaching a LCD display panel with an array of transistor circuits formed on a single crystal silicon and bonded to an optically transmissive substrate with an adhesive layer. However, none of these references teaches or suggests the Applicants' switching circuit under the direction of a timing circuit that switches a common voltage applied to a liquid crystal display. Hence, none of these secondary references overcomes the deficiencies of Novis for at least the reasons stated above.

Novis, alone or in combination with the other references cited in the Office Action, does not make obvious the invention described in amended Claim 14, and therefore the rejection of Claim 14 is overcome. Further, because none of the secondary references overcomes the deficiencies of Novis, and because the other claims depend from amended Claim 14, the reasons for allowance of claim 14 apply as well to the dependent claims.

Reconsideration of the rejections under 35 U.S.C. § 103(a) is respectfully requested.

CONCLUSION

In view of the above amendments and remarks, it is believed that all pending claims under consideration (Claims 14, 16, 17, 25-29, and 37-39) be allowed so the application can be passed to issue. If it is believed that a telephone conference might expedite prosecution of this case, the Examiner is invited to telephone the undersigned attorney at (978) 341-0036.

Respectfully submitted,
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MARKED UP VERSION OF AMENDMENTS

Claim Amendments Under 37 C.F.R. § 1.121(c)(1)(ii)

14. (Thrice Amended) A portable display system comprising:

a housing [having a volume of less than 330 cm^3];

an active matrix liquid crystal display mounted to the housing, the liquid crystal display including an array of [at least 75,000] pixel electrodes, [the array of pixel electrodes having an active area of less than 20 mm^2] a display control circuit that actuates the pixel electrodes to present an image on the display, and a light source that illuminates the image and is connected to the display control circuit, the display control circuit including a switching circuit that switches a common voltage applied to the liquid crystal display, and a timing circuit that determines when the display control circuit actuates the pixel electrodes to present an image, and flashes the light source to illuminate the image, and when the switching circuit switches the common voltage applied to the liquid crystal display to erase the image;

a lens that magnifies [an] the image on the display; and

a card reader [operating at least at 15 MHZ] positioned within the housing and that operates at least at 15 MHZ and receives video input to be [displayed] presented on the display from a card that docks with the card reader.

16. (Twice Amended) The portable display system of claim 14 wherein the [display comprises:] light source is a light emitting diode device [that illuminates the array of pixel electrodes].

17. (Twice Amended) The portable display system of claim 16 wherein the array of pixel electrodes comprises an array of at least 640 x 480 pixel electrodes.

25. (Amended) The portable display system of claim 14 wherein the card reader is a memory card reader [within the housing of the display unit] that receives the video input [to be displayed on the display] from a memory card that docks with the memory card reader.

26. (Amended) The portable display system of claim 14 wherein the card reader is a smart card reader [within the housing of the display unit] that receives the video input [to be displayed on the display] from a smart card that docks with the smart card reader.

27. (Amended) The portable display system of claim 14 wherein the liquid crystal display is a color sequential display.

28. (Amended) The portable display system of claim 16 wherein the array of pixel electrodes comprises an array of at least 320 x 240 pixel electrodes.